A Transparency Architecture for a Collaborative Software Development Environment

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Advisors:
Cláudia Werner & Marcos Borges
Motivation

Inadequate support for collaboration in current software development environments

Collaboration aspects: communication, coordination, memory and awareness
Context

Software development is a collaborative process

Trends:
- Global Software Development
- Distributed, virtual teams
- Distances in time and space
Problem

How to build collaborative software environments?
– Environment evolution
– Adequate group and task support
Building...

Scenario 1: existing environment
- Option A: Propose a collaborative version
- **Option B: Adapt an existing environment**

Scenario 2: non-existent environment
- Option C: Program from “scratch”
- Option D: Adopt a *toolkit*
- **Option E: Adopt an external group support server**
Proposal

Increment available collaborative support in existing environments
  – Collaborative applications and mechanisms

Propose a collaboration infrastructure
  – Non-intrusive, configurable, extensible
Hypothesis

Is it possible to transparently increase collaboration support in software development environments?
Goals

Optimization of cost-benefit ratio in producing, configuring, and maintaining group support

An strategy to integrate group support in real software development scenarios

Systematic description of a collaborative environment family of applications

Construction, use, and observation of a prototype in the Odyssey Share environment
Agenda

Transparency collaboration architecture
Event interpretation
Examples
Next steps
Transparency Collaboration Architecture

Capture, secure, analyse, and distribute events

Increase collaborative support by adding

(a) Applications
(b) Collaborative mechanisms
Application model

(adapted from Whitehead et al., 2000)
Transparency Collaboration Architecture

Execution Environment
- Event Interpretation
  - Scriptlet
- Local history
  - Collector
- Group history
  - Injector
- Collaborative extensions
  - Collablet

Event and Notification System
- Session Control
- Directory
- Authentication and authorization
Agenda

Transparency collaboration architecture
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Next steps
Event Interpretation

- **Operational events**
  - Low Granularity
  - Low Quantity

- **Application events**
  - High Granularity
  - High Quantity

- **Semantic events**
  - Low Granularity
  - Low Quantity
Event Interpretation (examples)

Mouse move to X1,Y2

... 

Mouse move to Xn,Yn

Mouse left click

Add a new class in the diagram

Method YY signature changed

... 

Attribute XX removed

Method ZZ added

Class A has been changed
Event Interpretation

Limitations
– Error prone
– Incomplete

Verifiable
– Analysis of resulting artifacts
Agenda

Transparency collaboration architecture
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Examples
Next steps
Odyssey SDE
Examples

Shared Workspaces
Long-term collaboration
Shared Workspaces

Telepointer ...  

... and Mini-view window
Long-term collaboration

KREIJNS and KIRCHNER, 2001

KANTOR and REDMILES, 2001
# Group history

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<td>Tue Oct 2 15:02:0...</td>
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<td>Microsoft SQL Server 7.0 - 08/12/03 16:34:54</td>
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<td>Tues Oct 2 12:09</td>
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<td>dbms:com.postgresql:127.0.0.1:5432</td>
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Interpretation - OLAP Cube
Interpretation – OLAP Cube

Management-oriented queries

![Cube Browser - Awareness Cube](image)

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Agenda

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Next steps

Complete Odyssey Share prototype
Third-party feasibility evaluation
Work impact evaluation
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